

# Reduced volatile organic compound painting systems for transformers

## Frequently asked questions

### Technology and quality assurance

#### What exactly does low VOC mean?

Low VOC painting systems are systems which have a lower VOC (solvent) content than traditional high solvent (VOC) content paint systems. The EU directive 2004/42 defines VOC as follows:

"Volatile organic compound (VOC) means any organic compound having an initial boiling point less than or equal to 250°C". Volatile organic compounds are one component in the formation of hazardous ground level ozone.

#### Ozone – health effects

Excess concentrations of ozone are thought to hasten the deaths of thousands of people in the EU each year. Ozone is responsible for people having to take medication for respiratory conditions and gives rise to a variety of health problems including chest pain, coughing, throat irritation, and decreases in lung function.

Reference: European Environment Agency

#### Ozone – effects on ecosystem

Ozone results in visible foliar injury and in reductions in crop yield and seed production (20% or more in some areas).

#### What is the difference between low VOC and other painting systems?

In reduced VOC painting systems the amount of solvent used as a carrier for the solid paint particles has been significantly reduced or replaced with another type of non VOC carrier (e.g. water). In addition to making the paint more pleasant to work with for our employees this also reduces the health risks associated with the release of VOC's to atmosphere. A low VOC paint is designed to work exactly like conventional paints.

Most common type of paint currently used is solvent based.  
% of VOC in these paints: ~ 50%  
In addition, VOC is used for cleaning of equipment.

Compare this to the available alternatives

Water-borne paint (8-10% VOC)

High solid paint (8-15% VOC)

Powder coating (0% VOC).

#### Does this mean that ABB transformers I already own have an inferior paint system?

All that is changing is the carrier used to carry the paint from the gun to the substrate. The VOC's used in paint evaporate during the drying process leaving the solid paint behind. The new systems do exactly the same however the content of solvent in the paint is reduced and therefore amount of VOC evaporated is significantly reduced.

#### For which type of transformers is the low VOC systems applying (distribution, power, industrial)?

It is planned to introduce low VOC painting systems across the complete range of ABB transformers.

#### What are the advantages of using Low VOC paints?

- Significant improvement in environmental impact
- ABB and customers will be prepared for planned, more stringent legislation on emissions
- Standardization of paint systems on ISO standard 12944 across all manufacturing sites
- Systems and suppliers approved by ABB corporate research
- Common processes and standards, ABB ownership of the process
- Reduced manufacturing and delivery time of transformers
- Control and consistency of quality from sub-suppliers
- Reduced number of suppliers of paint
- Full global and local support from key suppliers
- Proven experience – Some of ABB's motors and transformer plants are already using low VOC systems

#### Is the Quality comparable to conventional painting systems?

All systems offered come with full ISO certification and references from within our own business units and also from external sources where the systems have been in use for many years. The systems chosen will offer standardization and secured quality. All systems being implemented have been tested and approved to ISO 12944 standards under the direction of ABB Corporate research. These systems offer the same or better quality than conventional systems. It is just the technology which differs here.

## Do you have special testing procedure to test the quality?

All suppliers under the direction of ABB Corporate research have submitted extensive test data based on their extensive requirements on paint systems. Outdoor exposure test results, where available and customer references have also been submitted for approval. For US markets testing data to relevant IEEE standards has been made available and reviewed. In addition to these tests, ABB Corporate research has insisted that all systems be tested to ISO 16701 (accelerated corrosion test involving exposure under controlled conditions of humidity cycling and intermittent spraying of a salt solution).

## Are the systems really tested in the field and can therefore be considered as reliable?

Each approved supplier has offered a range of customer field experiences ranging from industrial applications, shipbuilding, offshore oil platforms and wind-farms. In addition some of the systems are already in use for many years within ABB. Below is our reference list:

| Low VOC system             | Location      | Years of usage |
|----------------------------|---------------|----------------|
| Powder paint:              |               |                |
| (Distribution transformer) | Istanbul, TR  | 4              |
|                            | Steinkjer, SE | 10             |
|                            | Riyadh, KSA   | 3              |
| Water-based flow coat:     |               |                |
| (Distribution transformer) | Lodz, PL      | 7              |
|                            | Vaasa, FI     | 9              |
| Water-based spray:         |               |                |
| (Power transformer)        | Ludvika, SE   | 11             |
| High solid spray:          |               |                |
| (Power transformer)        | Lodz, PL      | 5              |

## Can the low VOC system be applied also in harsh environmental conditions (sea, industrialized area, extreme cold or hot temperatures, etc)?

Low VOC systems are available for all ISO 12944 classifications C2-C5M. We have also low VOC systems available which are tested to the NORSOK offshore standard. Individual customer needs can be discussed during the implementation phase to ensure an appropriate system is offered to fulfil their requirement.

## Commercial aspects

### What painting codes are available within the low VOC painting system?

Low VOC systems are available for all ISO 12944 classifications C2-C5M. We have also low VOC systems available which are tested to the NORSOK offshore standard. For the US market a range of systems tested to the relevant IEEE standards are available.

### Why is ABB changing to lower VOC painting systems?

This change is complimenting ABB's global sustainability strategy and Green transformer program. This is part of our drive to lower our environmental impact and help our customers to reduce theirs. This change promotes standardisation and secured quality – all systems being implemented have been tested and approved to ISO 12944 standards under the direction of ABB Corporate research. This change will ensure that both the company and our customers will be prepared for planned stricter legislation on emissions. This change will offer a significantly improved working environment for our employees.

### Are there other manufacturers making the same changes?

ABB is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. As a company it prides itself on being the first to market with many initiatives. It is anticipated that due to stricter legislation pending in many regions, that our competitors will be forced also to look at more environmentally friendly solutions.

### Can I still get the transformer painted with a conventional high solvent painting system?

It is planned that over a 2 year roll-out period all ABB manufacturing sites will have converted to lower VOC painting systems. It is not planned to have conventional paint systems available after the implementation period.

### Can I get the transformer painted according to my specification with low VOC?

Individual systems will be reviewed in conjunction with our chosen paint partners to ensure that the low VOC system offered meets or exceeds the customers specification.

### What are the benefits of changing to a common reduced VOC painting system?

As a result of this change, customers will benefit from standardized paint systems across all manufacturing sites. This will yield the benefits of common systems and processes to secure the quality of the painted surface irrespective of where manufacturing takes place. Due to the implementation of modern processes, customers may also benefit from reduced manufacturing and delivery times.

### **Can I get a longer warranty when using reduced VOC painting systems?**

The low VOC painting systems chosen will be selected to match or exceed the existing paint system in use. On this basis no extended warranty will be required. Individual concerns regarding the warranty period can be reviewed during the implementation or negotiations.

### **Can I expect any incentives from the government if I apply low VOC painting systems?**

There are many programs and certifications available which can be used to promote the use of sustainable products and services. In some cases government incentives or tax credits may apply. Availability of such a scheme should be investigated locally. Examples of such schemes are as follows:

- LEED (Leadership in Energy and Environmental Design) Program (USA)
- MIA and Vamil subsidies for environmentally friendly equipment (Holland)
- EPA E3 initiative (USA)

### **Does the application of the reduced VOC system influence the price of the transformer?**

Implementation of the lower VOC paint systems will have no impact on the price of the transformer.

### **Does the application of the reduced VOC system influence the delivery time?**

Due to the implementation of modern processes customers may benefit from reduced manufacture and delivery time.

## Suppliers

### **Which paint suppliers does ABB use for reduced VOC painting systems?**

Supplier Shortlist – Global Partners

- Hempel
- Akzo Nobel (International Paints)
- Valspar

Supplier Shortlist – Regional Partners

- Tikkurila (Europe)
- Teknos (Europe)
- Strathmore Products (US)

### **How was the procedure to chose your paint suppliers?**

A global tender process was undertaken starting with 12 large suppliers of paint most of which are current suppliers to ABB. Through this process which took almost 12 months to complete, the number of suppliers was reduced to the approved global and regional partners. The tender process involved commercial, technical and quality aspects. The commercial aspects were controlled by PG commodity manager and the technical aspects performed under the direction of ABB corporate research in Sweden.

### **How is the quality of your paint suppliers monitored?**

All suppliers have been commercially and technically evaluated and operate quality systems approved according to ISO-9001. ABB has engaged at senior level within the chosen company's to ensure that only approved and tested systems are implemented at factory local level. Paint suppliers are included in ABB's existing regular supplier quality monitoring review process to ensure ongoing compliance. This is the same procedure applied as for other ABB suppliers.

### **Can I get the transformer painted with the paint of the supplier I chose?**

The painting system offered and paint supplier will be defined by the factory and customers will be able to choose a paint system from the appropriate ISO corrosion category.

## Legislation and regulations

### **Is this painting system/code required by any governmental legislations?**

Regulations are different from country to country and legislation is continually changing as a result of tougher emission controls. In Europe, Solvent Emissions Directive 1999/13/EC will generally apply. However, in some cases, individual countries have adopted lower limits. The USA operates in a very complex system of regulations at a number of levels such as Federal, State and District, which are coordinated by the US EPA. In Canada, CEPA1999 is being amended to include limits on VOC emission.

### **Do we need any special approvals to have this painting system applied (TUV, SEV, national standards, etc.)?**

Any supplementary local certification needs will be met in conjunction with our chosen paint suppliers during factory implementation. Our chosen paint suppliers are well-known international suppliers operating in all regions and familiar with any requisite local approvals.

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